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CASE OF SUPERFICIAL INCOMPETENCE

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Large Recurrent Circumferential Ulcer Due to Primary Incompetence of Long Saphenous Vein (Possibly Perforators) with Competent Deep Venous System

A 65-year old lady from the Big Island of Hawaii, who works in a coffee plantation and has 5 children, developed increasing varicose veins during the pregnancies. She has no previous history of DVT. Thirty years ago, in the end of the 60's she developed the first ulceration of the right leg. It developed gradually into a circumferential ulceration and amputation of the leg was recommended. In 1972, Dr. Yee in Honolulu operated on the patient with skin grafting and the ulcer remained healed for several years. Since the beginning of the 80's she has had several recurrences but never sought medical advice due to the previous threat of amputation. Since the beginning of the 90's the ulcer never healed and has developed into a large painful circumferential ulceration that she was treating with local herbs without compression. Because of the pain she again consulted Dr. Yee in November 1995 and she was referred to the vascular service at Straub in Honolulu.

At admission she had a circumferential, granulating ulceration at the lower part of the right leg with a length of 12 cm (Fig. 1). Cultures showed growth of staphylococcus and pseudomonas. She had normal pulses in the posterior tibial and dorsalis pedis arteries. Hand-held Doppler examination showed severe reflux of the long saphenous vein with competent deep veins.

Duplex scanning of the veins showed patent and competent deep venous system. There was severe reflux of the long saphenous vein which communicated with the short saphenous vein through a Giacomini communicator. SSV was competent. There were no incompetent perforators, but the area under the large ulceration could not be studied. Ascending venography showed no obstruction and no signs of previous DVT; the deep veins as well as the long saphenous vein were widely patent; there were several perforators between the posterior tibial vein and the long saphenous vein (incompetent?)

Descending venography of the right leg through catheterization of the left femoral vein showed grade 4 reflux of the long saphenous vein. The deep femoral vein was competent and there was a slight grade 2 reflux of the proximal superficial femoral valve (Fig. 2).

CEAP CLASSIFICATION: C2,3,4,5,6s; Ep; As; Pr2,3

Figure 1.– 65 year old woman at admission with a circumferential granulating ulceration of the right leg with a length of 12 cm.

(Figures 2 & 3 on the next page)

DISCUSSION

DR. O'DONNELL: I think everybody agrees that ligation and stripping is most appropriate. What isn't settled is whether the perforators should be treated. I found it fascinating that we have a new anatomical finding that the perforators are now related to the long saphenous vein! The questions are: 1) do you treat the perforators at this time? And (2) how do you treat the basic lesion, the skin ulcer? Dr. Raju, would you place a skin graft on this ulcer at the same time or leave it alone?

DR. RAJU: I think I would just strip the saphenous vein and skin graft the ulcer at the same time. However, our practice has been altered a little bit in recent years simply because the gatekeepers don't allow us to pre-admit these patients. There is no luxury of admitting these patients for a week and give them antibiotics even though you can do it with a great deal of effort. We just admit them in the morning unless the patient is septic. If the wound is reasonably clean, we proceed and have even done deep venous reconstruction under those circumstances. Even though you would think that the incidence of infection would be high, it is not very different from

Figure 2.– Descending venogram of the right leg through catheterization of the left femoral vein showed severe reflux (Kistner grade 4) of the long saphenous vein (upper right arrow), competence of the deep femoral vein (left arrow), and slight reflux (Kistner grade 2) of the proximal superficial vein (lower right arrow).

Figure 3.– Healing of the circumferential ulcer after high ligation and stripping of the long saphenous vein with skin grafting. The patient has remained healed for more than 3 years.

clean contaminated cases. So I think there should be less preparatory time before you do what you need to do.

DR. O'DONNELL: Ralph, what would you do? Are you going to use a venous pump for these patients?

DR. DEPALMA: No! I would operate on this patient, strip the long saphenous probably from above downward and all the way to the ankle.

DR. O'DONNELL: Why are you going all the way to the ankle?

DR. DEPALMA: Well, I'd get as close as I could to the ulcer. I think about 20 percent of saphenous vein have deep perforators associated with them by other communicators at the same level. Dr. Cockett has shown pictures of this anatomy. I've seen it frequently in my own dissections. So I think in this case the saphenous vein is the main point; I wouldn't worry separately about the perforators. I am concerned, however, about the combination of organisms present here. They reported staphylococcus and pseudomonas in this case. I would be very worried about these. I would clear that patient for a 24-48 hours hospitalization with IV vancomycin and an effective anti-pseudomonas drug. I would probably treat the ulcer locally with sulfa-mylon after this treatment. I'd go ahead and strip. I would not attack the deep system at this point. Then I'd graft, all at one operation. I would mesh the graft and keep that patient in the hospital for three to four days on IV antibiotics with the leg elevated.

DR. PERRIN: I agree with Ralph DePalma. I will try first to heal the ulcer by compression, lateral compression, but I will operate on him before I complete healing. I will prescribe antibiotics, systemic antibiotics, the day before or four or five days before the operation, but I will do high ligation and stripping.

DR. O'DONNELL: You strip down to the ankle, and I think it's nice to say that, but as I remember, this ulcer is circumferential. So what happens to the saphenous vein across this ulcer? Dr. Perrin, where would you strip to?

DR. PERRIN: I would strip to the ankle in this case.

DR. O'DONNELL: It would be pretty tough to get anterior to the medial malleolus in this patient, but maybe you know better.

DR. DEPALMA: I have an opinion. I'd make an incision over the saphenous at the malleolus, and pass a lighted probe proximally. If the vein is there, I would probe it upwards with the lighted probe to see if it went to the knee. If it were in continuity under the ulcer, I would strip it. I'd remove the long saphenous completely to the ankle. I probably would make a malleolus incision -- there's room there. When you can see the anterior malleolus the vein is probably under it. So I'd pick it up here first.

DR. KISTNER: I agree with cleaning it up, probably including intravenous antibiotics, and then going ahead with surgery. Surgery would be similar to what the others have suggested. We begin with ambulatory treatment with unna boot on these cases to see how they respond. The response may be dramatic and helps make a quicker, safer treatment phase. If this is not successful, I'd go ahead with surgery. The question I'd like to ask is whether those who would treat with stripping and skin grafting would use prophylactic anticoagulants? This is a patient who has venous disease and will be on bed rest for a period of time. I'd ask Ralph about that.

DR. DEPALMA: If I were going to put the patient to bed, I would probably use Lovenox in prophylactic dose, 30 milligrams BID, Sub Q.

DR. O'DONNELL: The rest of the panel pretty much concludes

they would use prophylaxis here.

DR. DALSING: I have one question. Was that a swab or did you actually take some tissue and send it for culture, because I think it makes a difference. A swab culture can grow almost anything if it's an open wound without protective skin. So I'm not so sure I'd be that worried about systemic or even significant local infection in the wound. This looks like a real clean ulcer to me. So I'm not so sure I'd be as aggressive with antibiotics. I'd probably administer perioperative antibiotics. In terms of therapy, I agree with the stripping operation probably being just above the ulcer and ignore the perforators for now.

DR. O'DONNELL: Peter, would you add a SEPS procedure because there are perforating veins here. It's hard to believe that a patient with an ulcer like this doesn't have incompetent perforating veins in addition to her greater saphenous incompetence. Would you go ahead and do a SEPS?

DR. GLOVICZKI: This is a patient I would not necessarily insist to perform SEPS on. I would operate on the superficial system. I would strip the saphenous vein all the way down as far as I could above the ulcer. It makes no sense to leave in an incompetent calf saphenous vein in this patient. This patient does not have proven significant perforator incompetence, and with that amount of circumferential ulceration, it may be technically difficult to gain good access to the subfascial space.

DR. O'DONNELL: Just to get the panel's opinion, would anybody use Apligraf?

DR. GLOVICZKI: I have recently used Apligraf several times in this situation. If the ulcer is infected however, it is not going to work. So you really want to clean it up thoroughly before you put the Apligraf on it.

DR. BELCARO: This is a very good example that surgery should be performed by a group of people with different competences. When you come here and talk about saphenous vein stripping and perforators, it's only part of the problem. Surgery is evolving. You have to consider many aspects. You have to be a physician expert in medical therapy. You have to have different competences. I know we say that for hammers everything is a nail, but the point is that surgery is only part of the solution of the problem because you can do anything and after three months you have the patient with the same problem. So the focus of a faculty like this is to address that surgery is changing. Surgical treatment is only part of a complex treatment, which includes medical treatment, psychology, tutorials, and several other aspects. If we focus only on stripping, and interrupting perforators, we really miss the point because the evolution is not in simple superficial competence but in integrating different levels of competence.

DR. O'DONNELL: Well, I appreciate those remarks, and I guess that defines who a vascular surgeon is, in the United States at least. Vascular surgeons do medical as well as surgical therapy. I agree with you that it needs to be a team approach. To think that vascular surgeons in the United States, however only focus on surgery I think is a miscalculation.

DR. CAPRINI: I just wanted to bring up a couple of things because we have such an outstanding panel here just to see what they might say. We have been taking a look at the saphenous with the duplex. In many cases just below the knee the saphenous turns normal so we usually don't strip the calf part of the saphenous. However, in cases like this case report we almost always see that the saphenous is big all the way down to the ankle with duplex. When it is, we try to strip all the way to the ankle. That would be what I would use to determine whether or not to fully take out the vein. Another thing is that I notice this patient has pretty bad toes, and one of the things that we found in taking care of some of these patients is to make absolutely sure to eradicate any elements of fungal infection in those toes before we do a definitive operation. We've also used pneumatic compression, but with foot compression, or foot and calf compression, we've gotten pretty good results, especially if like Raj said, there was some problem getting that patient right into the hospital when they didn't want to come. The other thing is that I think as far as prophylaxis is concerned this patient needs a risk assessment. If that patient has a lot of risk factors, then that patient should have prophylaxis. With surgery in age over 65, something like low molecular weight Heparin would be indicated. Then finally, a comment about after care. As was mentioned, a lot of these patients wouldn't wear their Class II appropriate stocking, but we found sometimes we can get them to wear the circaid device.

DR. THORPE: It concerns me that two of the speakers said they didn't think venography was of any value, and I want to say that I think it's very important as part of the workup. In fact, I've seen a patient who had this situation, stripping and valvuloplasty, and later underwent an amputation. Now, when ulcers start to happen on the opposite leg, we look at the IVC. It's possible that in some of these patients there's a high caval stenosis or a caval occlusion that can be treated. We didn't know how to do this ten years ago but now we can look in the iliac or cava for an obstructive problem that could account for venous hypertension in one leg or both legs.

DR. O'DONNELL: Well, that's interesting. Certainly in our unit we probably would not get a phlebogram. We'd rely on duplex scan, but I'd be curious what the panel would do. How many would opt for obtaining a phlebogram. Three out of the panelists agree with you, Patricia. So that's interesting, probably in an advanced case.

DR. MYERS: Can I propose a totally different approach to this patient than that given by the panel? I think Mark Malouf made the most important comment, and that is that removal of the long saphenous vein is not required to heal this ulcer, but is required to prevent it from recurring. Therefore, I don't personally believe there is any hurry whatsoever to remove the long saphenous vein. Now, if you look at the ulcer, a lot of it is over quite mobile parts of the leg, and I consider that ambulatory treatment has the potential to markedly reduce its size and possibly even get it to heal without the need to admit the patient to the hospital. I would certainly start on a regime of local dressings with simple gauze, and an extremely tight compression bandage to get rid of the venous hypertension that's causing it with the expectation that the combination of contraction and epithelial growth into the ulcer will markedly reduce its size and the extent of the skin graft that you may or may not require at the end. I think this is an eminently healable ulcer. Once it's healed, then at some time at your convenience, perhaps even on an ambulatory basis, the long saphenous vein can be removed purely to prevent recurrence and not to help the healing of the ulcer. This would result in the least time in hospital and the greatest praise from your medical insurance group.

DR. O'DONNELL: Do the rest of the panelists agree that they would not strip the vein, that they would try a course of compression

and special wound mendicants rather than stripping? Do you all agree with that?

DR. DEPALMA: No, I don't. I think it would take a long time to get this ulcer to heal, and I think it would be sort of what I describe to my residents as "diddlefritz." I don't think I'd get that to heal in any reasonable time. I couldn't, maybe Kenneth could. I would just get right to surgical treatment and do it.

DR. KISTNER: While external treatment may get it to heal, I think it heals quicker if you take care of the venous pathology and this pathology is easy to take care of. I think it should be repaired surgically.

DR. O'DONNELL: Maybe you could comment because there's a thread of Kevin Burnand's thesis of "predestination" to venous ulcer. In New England a long time ago there was a religious movement that held everybody was predestined, either to heaven or hell. As Burnand espoused yesterday, ulcers are similarly predetermined in to which ones are going to heal and which are not. Can you predict whether this ulcer is going to heal or not depending on whatever you give, Bob? Do you subscribe to that predestination theory?

DR. KISTNER: No, I don't.

DR. GLOVICZKI: I concur with Bob that although you could reach complete healing without treatment, why would you want to leave a largely incompetent greater saphenous vein and have a persistent, otherwise treatable cause of venous hypertension even during the healing period? Once the infection is treated, I would treat the underlying cause and operate.

DR. GOREN: It is a pity that additional data such as VFI and the size (by duplex) of the long saphenous vein is not available. I would like to congratulate Dr. Villavicencio for his excellent presentation of sclerotherapy approach. May I quote the late Dr. Tim Myers from the Mayo Clinic who said many years ago that "sclerotherapy (for truncal varicose veins) is a return to the Dark Ages of medicine." This statement is also true today in spite of the introduction of the guided injection method. Superficial reflux was shown by Bjordal in the early seventies to be the cause of elevated ambulatory venous pressure in truncal varicose veins, and its elimination is a must for a long lasting result. But I take issue with the arbitrary removal of the entire length of the long saphenous vein to achieve that goal. Prof. Hach has classified long saphenous varicosities according to the location (in the saphenous trunk) of the end reflux point into four groups. Only in group IV (the "straight through" incompetence of Tibbs of Oxford) will the ankle to groin stripping be indicated. In 1082 consecutive operated long saphenous varicose limbs in my practice, only in 7% (66 limbs) was there need for a total ankle to groin stripping. In the majority of cases (74% or 704 limbs) the end reflux point was found located just below the knee (Hach group III), thus a stripping to this level will was performed. In this particular case, since the end reflux point was not assessed, any blind approach would be a questionable approach. I fully subscribe to Dr. Belcaro's suggestion that maximum possible preservation of the long saphenous vein trunk is imperative in all cases. The Hach classification based on the location of the end reflux point will aide in this noble quest.

DR. O'DONNELL: Yes, and to your point, I think the organizers did provide the information. They did a descending phlebogram which was interesting. It was a Grade IV reflux.

DR. DEPEDRO: May I have the lateral projection slide of the ulcer. Although I am a vascular surgeon, I think that the point should be at first what we do in our country in a case like this. We think that unless we mobilize the fixed tibial tissue via physiotherapy and take this to a lesser stage of severity, we cannot treat the rest of the pathology of the venous reflux. We first utilize physiotherapy to liberate the joint and improve the muscular pump function, and afterwards we do surgery. If this is not done, the wound is predestined to poor healing no matter what kind of surgical technique you use.

DR. O'DONNELL: That's a very good comment, and it goes along with what Dr. Belcaro said, that this should not just be a bunch of surgeons. It should be a multi-modality team. In addition to the psychiatrist and the social worker, now we've added the physiotherapist. So I think that's a very good point.

DR. ABU-BAKER: I'd like to congratulate all the participants about their good workshops. So about my thinking, we have here two problems to treat. The first one is the reflux of the venous saphena and the perforants, and the other thing is the big varicose ulcer. To treat the reflux, we have many methods. We can do invasive surgery by stripping, or noninvasive surgery, which means micro phlebectomy. The second is sclerotherapy, or echo-guided sclerotherapy. Third, we can make a compression bandage. Other, treatments include drugs such as Daflon, Detralex and Glivenol. So about the surgery, we have two things to do. First of all, the reflux of the saphenous vein. We can strip it and make a skin graft at the same time. As the ulcer margin I think, we must go with a knife below it because just to take it away. The case is very simple, but you must know how to do it. Within three months I can close the ulcer.

DR. ALLEN: I'd like to ask the panel if they would consider using growth factors in the treatment of this ulcer.

DR. RAJU: I have a brief comment. I think this patient will not come back to you if you delay definitive treatment too much. She has been living with this ulcer for 20 or 30 years, and has been totally noncompliant. I think these modalities that take a long time, will lose this patient. I think you should approach this patient quickly, do what you have to do, and if you want to fiddle around with long term modalities, do that after you have done the basic stuff.

DR. O'DONNELL: The rest of the panel, do you use growth factors?

DR. DEPALMA: Very controversial. I don't, no. I really don't understand their rationale. I don't think I'd use them here. You just need to fix this thing: i.e., the reflux and graft the ulcer.

DR. DALSING: Growth factors are very expensive. I think the only time you should consider their use is when you've tried everything else and have a chronic wound that won't heal. This lady really hasn't been treated appropriately with compression and standard dressings. So I probably would not use growth factor agents on this wound.

DR. MALOUF: I have a very small comment about the antibiotics. There is some difference of opinion about the use of antibiotics, but this is a relatively clean ulcer. The only antibiotics I would entertain using is the prophylactic antibiotics to preserve the skin grafts as the others suggested.

DR. VILLAVICENCIO: We use antibiotics in-patients with infected ulcers. The ulcers are always colonized, like in this particular case. I'm sure that when you take a swab you will grow

something. But when the ulcer is infected, it's painful, it's red, it's angry looking. In those individuals we have found that a course of IV antibiotics will quickly control the infection, and then you can go to further measures.

DR. BELCARO: Just an assumption. Every ulcer is infected. According to cultures, you will always find something there. So almost by definition as long as you have the skin open, there is an infection. So I think you should use antibiotic treatment any time you have an open ulceration.

UNIDENTIFIED SPEAKER: Can I come back on that? That's absolutely right. Even if you just deal with antibiotics, you're not going to get rid of all these parts. What you need to do, once you actually aim to heal it with skin graft, is just to actually protect your skin graft for the appropriate organism. It doesn't matter if you've got pseudomonas, staph, whatever. Skin grafts will take providing there is a good bed. What you need is to protect it from a hemolytic strep.

DR. PERRIN: I would propose that the patients would be assessed one month after surgery by a duplex scan in order to identify any perforating vein which was missed, or a collateral branch, in order to treat them because it is easy to miss something in this kind of patient. I think duplex is very helpful.

DR. TRIPATHI: Based on the experience with diabetic ulcers, what we in our center do with the venous ulcers is to take a superficial scrape and also use aspiration culture from the deeper layers of the venous ulcer. If the deeper layer culture is negative, then we go ahead and we scrape the superficial layer and put skin grafts in the OR with prophylactic antibiotics. I have never had a problem. I don't know if other people have experienced the same.

DR. PARSI: I'm interested in the role of microthrombi in the pathophysiology of this sort of ulcer. As you know, a lot of these patients have thrombophilia. Up to 26 percent of patients with ulcers have Activated Protein. Up to 40 percent have anticardiolipin C Resistance antibodies. Were these patients screened at all? Some of the thrombophilias like MTHR mutation with high homocysteine levels, can actually be treated with folic acid.

DR. O'DONNELL: That's a very good point. Certainly with deep venous reconstruction in our unit or in patients undergoing SEPS we would do a screening. What about this lady? Would most of you do a hematologic coagulation screen?

DR. KISTNER: No. This is pure primary reflux disease. I don't think she has any sign of thrombotic disease.

DR. DEPEDRO: A small comment. Permanent venous hypertension in this patient, which of the members of the panel think that this kind of ulceration is due to the insufficiency alone of the long saphenous vein and which think that this is due to the atrophy of the muscular pump?

DEPALMA: I think it's due to both factors, and I think she's absolutely right. There is wasting of the calf muscle. My idea in operating on it rapidly is to get it covered so that the patient can move the ankle around.

DR. RAJU: I think these massive ulcers are larger than what you think would be appropriate for isolate saphenous reflux. That seems to be somewhat more common in the older age group. We have seen a number of seventies and eighties with this kind of presentation that you don't see in the younger age group. So sclerosis of the deep veins and compliance changes might have something to do with it. I wonder whether anybody in the panel has seen the younger patient with this kind of isolated saphenous reflux with massive ulceration.

DR. KISTNER: The patient was 65 years old according to the history and had her first ulcer at 30 years. It brings up the question of where this patient has been in the 30 years. Has she been under any therapy at all or just totally neglected? The reason to raise this point is that there exists a mass of medical practitioners who have no understanding of this whole problem, and they would treat with a salve but never provide any compression. I wonder if this patient fits into that category.

SURGICAL MANAGEMENT

DR. EKLOF: This is an unusual case to show for saphenous vein incompetence. I took this case because I think it's a badly treated case for 30 years. The only alternative she was offered before was amputation of the leg, indicating how far we have to go to get widespread understanding of how to deal with sick patients like this. She had poor treatment until the most senior of surgeons in Hawaii, the first surgeon who got his American Board in Surgery sent her over to me, Lester Yee. He is now in his eighties and still practicing. I think he saved her at least from amputation. We admitted the patient, treated the infection, and cleaned up the ulcer. The reason we did the venograms was that I thought that this was more than just saphenous vein incompetence. It was such a longstanding ulceration. We couldn't find any perforators with a scanner under the ulcer. She had no perforators above the ulcer. We did high ligation and stripping of the GSV to just above the ulceration, and skin grafted the ulcer, which healed in about a week (Fig. 3). This was about three years ago. I tried many times to scan her, and I offered her to come to the hotel tomorrow to be part of the workshop, and scan her leg, but she could not make it. So I don't know more about the perforators in this patient. Pathology of the vein that we removed showed an arterialized vein due to the long standing turbulent reflux for many years.

II. PERFORATOR INCOMPETENCE

CASE OF PERFORATOR INCOMPETENCE - MAKING SEPS BETTER

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Perforator vein incompetence contributes to ulceration when abnormally elevated pressure is transmitted to the skin usually at the ankle medially. To correct this, a variety of surgical techniques have evolved; I suggest technical modifications of SubFascial Endoscopic Surgery (SEPS) to include extrafascial submalleolar perforator division and combinations of other interventions.

In 1966, Linton's approach to perforators was modified by eliminating longitudinal incisions, creating a series of bipedicle flaps in natural skin lines and avoiding areas of severe skin involvement. This procedure was performed by remote subcutaneous access